ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

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Acetone: Health Information Summary

Acetone is a clear, colorless, volatile and flammable liquid with a characteristic odor described as pungent or fruity. It is primarily used as an industrial solvent and chemical intermediate. Acetone is also found in paints, varnishes and lacquers and is used as a solvent for cements in the leather and rubber industries.

Because acetone does not adsorb to soil strongly and it is highly water soluble, acetone-containing wastes released to soil will tend to leach to groundwater. The odor threshold for acetone in water is reported to be 20 parts per million (ppm); the reported odor threshold in air is in the range of 13 to 20 ppm.

Acetone is a natural metabolism product of both plants and animals, including humans. Those who consume either a high fat, low carbohydrate diet, are fasting, exercise strenuously, or have uncontrolled diabetes are likely to produce higher than usual levels.

Health Effects

Absorption/Metabolism

Acetone is quickly absorbed by ingestion, inhalation, and dermal exposure. In two experiments with humans, inhalation absorption was in the 70 to 80 percent range. There is no data for the other routes. Absorbed acetone is almost entirely eliminated from the body within a day after exposure.

Short-Term (acute) Effects

Mild nervous system effects that abated soon after exposure ceased were seen in humans exposed to concentrations of acetone of 500 ppm in air and greater. Symptoms included irritation of the eyes and respiratory system, mood swings, and nausea. Accidental poisonings report similar nervous system effects of sluggishness and drowsiness that were not long lasting.

Only one animal study could be located, which investigated the effects of acetone exposure by ingestion. Rats were given drinking water containing acetone at a concentration of 25,000 ppm for 18 weeks. The only effect observed in the rats was weight loss, which may be attributed to decreased food consumption.

Humans, who were exposed to 500 ppm of acetone by inhalation, experienced eye and nasal irritation. Levels of exposure below 500 ppm did not cause any adverse health effects. In another

study, groups of students were exposed by inhalation to acetone concentrations ranging from zero to 1,000 ppm for six hours. At concentrations of 500 and 1,000 ppm, eye, nose and throat irritation were observed.

Long-Term (chronic) Effects

Workers exposed by inhalation of 1,000 ppm of acetone for three hours per day for seven to 15 years complained of respiratory tract irritation, dizziness, and loss of strength.

In an drinking water exposure animal study, effects on the blood in rats indicating an anemic condition were reported at doses of 1,700 mg/kg/day.

Carcinogenic (cancer producing) Effects

The one study conducted to investigate potential carcinogenic effects from inhalation exposure to acetone by workers did not find any excess cancer incidence. There is no data regarding the carcinogenicity of acetone in any animal studies. Chemicals similar to acetone have not been found to be carcinogenic to humans. Acetone has been categorized by the U.S. Environmental Protection Agency (EPA) as a Group D carcinogen (inadequate evidence to classify).

Reproductive/Developmental Effects

Male rats exposed to very high concentrations of acetone in drinking water (3,400 milligrams per kilogram of bodyweight/day) had increases in malformed sperm and reduced sperm movement. Whether these effects would impair reproductive ability is not known.

Health Standards and Criteria

There is currently no federal health based standard or criterion for acetone in drinking water. Mild kidney toxicity was observed at some concentrations in a rat study. Based upon this rat study, the EPA developed a non-cancer toxicity value (Reference Dose or RfD) for acetone. From the RfD, DES has derived a drinking water guideline of 6,000 ppb.

The Occupational Safety and Health Administration (OSHA) enforceable standard (permissible exposure limit or PEL) for acetone in workplace air is 1,000 ppm averaged over eight hours.

Suggested Reading and References

Casarett and Doull's Toxicology: The Basic Science of Poisons, Fifth Edition. Klaassen, C.D., ed. McGraw-Hill Publishing Co., Inc., New York, 1995.

Toxicological Profile for Acetone (Update). Agency for Toxic Substances and Disease Registry (ATSDR). Atlanta, GA. May, 1994.

Toxicological information on acetone. Integrated Risk Information System (IRIS). U.S. EPA, Office of Health and Environmental Assessment. Last significant revision: July, 2003.

Toxicological Review of Acetone. In support of summary information on the Integrated Risk Information System (IRIS). U.S. EPA, Office of Solid Waste and Emergency Response. May, 2003.